

Appl. No. 09/628,922
Amdt. dated August 24, 2004
Reply to Office Action of May 27, 2004

AMENDMENTS TO THE CLAIMS

Claims 4, 15, 18 and 19 are allowed. Claims 1-5 and 7-21 are pending and claims 1-3, 5, 7-14, 16, 17, 20 and 21 are rejected. Please amend claims 1, 5, 8, 9 and 16 as set forth in the following listing of the claims.

1. (currently amended) A color head-up display, in particular for vehicles, in which the light from a light source (2) is transmitted through an at least partially light-transmitting display (3) and is projectable onto a windshield, wherein a multiplicity of red, a multiplicity of blue and a multiplicity of green light-emitting diodes (10-12) are arranged without packaging on a common support (16, 17, 19)[[,]] and wherein the common support comprises a thermally conductive heat distributing support extending along an array of the diodes for supporting the diodes, the heat-distributing support serving as a heat-dissipating device (19) for cooling the light-emitting diodes ~~is present~~, wherein the individual light-emitting diodes (10, 11, 12) are chip pads fitted on a metallic support material array.

2. (previously presented) The color head-up display as claimed in claim 1, wherein said multiplicity

of light-emitting diodes (10, 11, 12) is arranged in the form of a compact array.

3. (previously presented) The color head-up display as claimed in claim 2, wherein said compact array is configured in the form of a matrix.

4. (previously presented) A color head-up display, in particular for vehicles, in which the light from a light source (2) is transmitted through an at least partially light-transmitting display (3) and is projectable onto a windshield, wherein a multiplicity of red, a multiplicity of blue and a multiplicity of green light-emitting diodes (10-12) are arranged without packaging on a common support (16, 17, 19), and wherein a heat-dissipating device (19) for cooling the light-emitting diodes is present, wherein the number of light-emitting diodes of one color is adapted to the spectral sensitivity of the eye and to the spectral efficiency of the diodes.

5. (currently amended) A color head-up display, in particular for vehicles, in which the light from a light source (2) is transmitted through an at least partially light-transmitting display (3) and is projectable onto a windshield, wherein a multiplicity of red, a multiplicity of blue and a multiplicity of green light-emitting diodes (10 - 12) are arranged without packaging on a common support (16, 17, 19), and

wherein the common support comprises a thermally conductive heat distributing support extending along an array of the diodes for supporting the diodes, and a thermally conductive electrically insulating layer is disposed between the heat distributing support and the diodes, the heat-distributing support serving as a heat-dissipating device (19) for cooling the light-emitting diodes ~~is present~~, said multiplicity of light-emitting diodes (10, 11, 12) is arranged in the form of a compact array, and wherein the compact array has a largely round form.

Claim 6 (canceled)

7. (previously presented) The color head-up display as claimed in claim 1, wherein in each case at least one bonding wire (15) is connected to said chip pad (10, 11, 12) and to the support material array (9).

8. (currently amended) A color head-up display, in particular for vehicles, in which the light from a light source (2) is transmitted through an at least partially light-transmitting display (3) and is projectable onto a windshield, wherein a multiplicity of red, a multiplicity of blue and a multiplicity of green light-emitting diodes (10-12) are arranged without packaging on a common support (16, 17, 19), and wherein the common support comprises a thermally conductive heat distributing support extending along an array of the diodes for supporting the diodes, and a thermally conductive electrically

insulating layer is disposed between the heat distributing support and the diodes, the heat-distributing support serving as
a heat-dissipating device (19) for cooling the light-emitting diodes ~~is present~~, wherein a plurality of said light-emitting diodes (10, 11, 12) are connected in series.

9. (currently amended) A color head-up display, in particular for vehicles, in which the light from a light source (2) is transmitted through an at least partially light-transmitting display (3) and is projectable onto a windshield, wherein a multiplicity of red, a multiplicity of blue and a multiplicity of green light-emitting diodes (10-12) are arranged without packaging on a common support (16, 17, 19) [[,]]
; and

wherein the common support comprises a thermally conductive heat distributing support extending along an array of the diodes for supporting the diodes, the heat-distributing support serving as a heat-dissipating device (19) for cooling the light-emitting diodes ~~is present~~, a plurality of said light-emitting diodes (10, 11, 12) are connected in series, and a plurality of said light-emitting diodes (10, 11, 12) of one color is connected in series.

10. (previously presented) The color head-up display as claimed in claim 1, wherein the at least partially light-transmitting display (3) is a liquid crystal display.

11. (previously presented) The color head-up display as claimed in claim 10, wherein said display (3) is a color liquid crystal display, and wherein the light source (2) simultaneously emits red, green and blue light.

12. (previously presented) The color head-up display as claimed in claim 10, wherein said liquid crystal display (3) is a monochrome liquid crystal display, and wherein the individual colors of the light-emitting diodes are successively switchable on and off in a rapid sequence.

13. (previously presented) The color head-up display as claimed in claim 1, wherein a condenser lens (7) is arranged between the light source (2) and the display (3).

14. (previously presented) The color head-up display as claimed in claim 1, wherein light from the light-emitting diode (10 - 12) is reflected by one or a plurality of mirrors and is transmitted through the display (3).

15. (previously presented) A color head-up display, in particular for vehicles, in which the light from a light source (2) is transmitted through an at least partially light-transmitting display (3) and is projectable onto a windshield, wherein a multiplicity of red, a multiplicity of blue

and a multiplicity of green light-emitting diodes (10-12) are arranged without packaging on a common support (16, 17, 19), and wherein a heat-dissipating device (19) for cooling the light-emitting diodes is present, wherein there are a plurality of displays (3) and a plurality of said light sources (2).

16. (currently amended) A color head-up display, suitable for vehicles, in which the light from a light source is transmitted through an at least partially light-transmitting display and is projectable onto a windshield, wherein a multiplicity of red, a multiplicity of blue and a multiplicity of green light-emitting diodes are arranged without packaging on a common support comprising a plurality of layers, one of said layers being a thermally conductive electrically insulating layer, and a further one of said layers being a heat distribution and cooling layer, said insulating layer being disposed between said light-emitting diodes and said cooling layer, wherein said heat distribution layer comprises a thermally conductive heat distributing support extending along an array of the diodes for supporting the diodes, and the individual light-emitting diodes (10, 11, 12) are chip pads fitted on a metallic support material array (9).

17. (previously presented) The display as claimed in claim 16, wherein the light-emitting diodes are arranged in rows and columns on said support.

18. (previously presented) A color head-up display, in particular for vehicles, in which light from a light source is transmitted through an at least partially light-transmitting display and is projectable onto a windshield, wherein the light source comprises a multiplicity of red, a multiplicity of blue and a multiplicity of green light-emitting diodes arranged without packaging on a common support, and wherein the head-up display includes optical means for distributing light emitted by respective ones of the light-emitting diodes upon the at least partially light-transmitting display, and further includes a heat-dissipating device for cooling the light-emitting diodes, and

wherein the light-emitting diodes of the various colors are selected by color in accordance with the spectral sensitivity of the eye to cause an observer to experience a sensation of brightness, thereby to accomplish a dimming of the head-up display.

19. (previously presented) A method of dimming a color head-up display, in particular for vehicles, in which display the light from a light source is transmitted through an at least partially light-transmitting display and is projectable onto a windshield, wherein the method includes steps:

of providing the light source with a multiplicity of red, a multiplicity of blue and a multiplicity of green light-emitting diodes, and arranging the light-emitting diodes without packaging on a common support;

distributing light emitted by respective ones of the light-emitting diodes upon the at least partially light-transmitting display; and

selecting individual ones of the light emitting diodes by color in accordance with the spectral sensitivity of the eye to cause an observer to experience a sensation of brightness, thereby to accomplish a dimming of the head-up display.

20. (currently amended) The color head-up display as claimed in claim 1, wherein electrical connections provided to the multiplicity of the red light-emitting diodes, to the multiplicity of the blue light-emitting diodes, and to the multiplicity of the green light-emitting diodes enable[[s]] electrical activation of the diodes to attain a desired coloration to the display.

21. (previously presented) The color head-up display as claimed in claim 20 wherein a row of light-emitting diodes of a first of said colors is interleaved with a row of light-emitting diodes of a second of said colors.